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10/735,989

12/15/2003

Somenath Mitra

436/12

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09/07/2005

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EXAMINER

FASTOVSKY, LEONID M

ART UNIT

PAPER NUMBER

3742

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/735,989

Applicant(s)

MITRA ET AL.

Examiner

Leonid M. Fastovsky

Art Unit

3742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 5, 10 and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al (5,855,801).

Lin teaches a microheater for microfluidic devices comprising a microchannel 78 formed on a silicon substrate-wafer 46, and a conductor pads 36 formed in the microchannel 78, the microheater is formed from heating resistors 60 (col. 3, lines 20-67, col. 4, lines 1-10 and Fig. 1).

As for claim 14, Lin meets all limitations of the claim including patterning of the substrate-wafer 46 (col. 4, lines 21-67).

As for claim 15, Lin teaches etching of the substrate 46 with a boron-doped region 52 (col. 4, lines 6-67).

3. Claims 1-2, 5-6, 9-11, 13-14 and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee (2004/0062468).

Lee teaches a microheater 101 and method of fabricating the microheater for microfluidic devices comprising a microchannel 20 formed on a substrate 11 made of quartz ([0053]) and further comprising an electric conductive layer 51, comprising metal-aluminum, disposed in the microchannel 20 ([0049],[0052], [0053] and Fig. 1-4).

As for claims 9, 13 and 20, Lee teaches an insulating layer 52 comprising glass-silicon ([0057]).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Ferguson.

Lin discloses substantially the claimed invention, but does not disclose quartz and borosilicate glass. Ferguson discloses resistive heating systems with a substrate 202 comprising quartz and borosilicate glass (page 10, [0068]). It would have been obvious to one having ordinary skill in the art to modify Lin's invention to include the substrate comprising quartz and borosilicate glass as taught by Ferguson in order to provide a more rigid structure for the microheater.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee. Lee discloses substantially the claimed invention including the conductor comprising aluminum, but does not disclose specifics of the material. The limitation of the conductor

comprising an aluminum alloy with 99% aluminum and silicon and copper, it is deemed that the material used for conductor would be chosen by user having a desired result in mind. Therefore it would have been obvious to make Lee's conductor made out of 99% aluminum and silicon and copper as to obtain the result wanted by the user.

7. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Yamazaki and further in view of Ueno et al.

Lee discloses substantially the claimed invention, but does not disclose a substrate comprising a polished silicon wafer, and the conductor-heater comprising boron ions. Yamazaki discloses a method of doping a silicon film 203 with boron ion (col. 15, lines 1-18). Ueno discloses a microfluidic device having a heater 3 with a mirror- polished substrate (page 5, [0094]). It would have been obvious to one having ordinary skill in the art to modify Lee's invention to include a boron doped substrate as taught by Yamazaki and a polished substrate as taught by Ueno and a conductor comprising boron ions as taught by Yamazaki in order to assure better heating conditions for the microheater.

8. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin or Lee in view of Yamazaki.

Lin or Lee in view of Yamazaki disclose substantially the claimed invention, but do not teach boron ion implantation. Yamazaki teaches a method of implanting boron (col. 15, lines 1-10). It would have been obvious to one having ordinary skill in the art to modify the invention of Lin or Lee in view of Yamazaki to include a boron ion implantation in a method for fabricating a microheater because prior art references do teach performing a process and also structure limitations of the invention.

**Response to Arguments**

9. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid M Fastovsky whose telephone number is 571-272-4778. The examiner can normally be reached on M-Th. 8.00 am -6.00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Leonid M Fastovsky  
Examiner  
Art Unit 3742

lmf

8/30/05

  
ROBIN O. EVANS  
PRIMARY EXAMINER

9/2/05